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## DEFENSE ACQUISITIONS

# Realizing Savings under Different Littoral Combat Ship Acquisition Strategies Depends on Successful Management of Risks

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Mr. Chairman and Members of the Committee:

I am pleased to be here today to discuss the Department of the Navy's proposed dual ship acquisition strategy for the Littoral Combat Ship (LCS) program. LCS is envisioned as a vessel able to be reconfigured to meet three different mission areas: mine countermeasures, surface warfare, and antisubmarine warfare. Its design concept consists of two distinct parts—the ship itself (seaframe) and the mission package it carries and deploys. The Navy is procuring the first four ships in two different designs from shipbuilding teams led by Lockheed Martin and General Dynamics, which currently build their designs at Marinette Marine and Austal USA shipyards, respectively.

The Navy's strategy for procuring LCS has evolved over the years. Prior to September 2009, the Navy planned to continue building the class using both ship designs. This strategy changed following unsuccessful contract negotiations that same year for fiscal year 2010 funded seaframes—an outcome attributable to industry proposals priced significantly above Navy expectations. In September 2009, the Navy announced that in an effort to improve affordability, it was revising the LCS program's acquisition strategy and would select one seaframe design before awarding contracts for any additional ships.<sup>1</sup> Following approval of this strategy in January 2010, the Navy issued a new solicitation—intended to lead to a downselect—for fiscal year 2010 seaframes. In support of this strategy, Congress authorized the Navy to procure up to 10 seaframes and 15 LCS ship control and weapon systems. The Navy planned to have a second competition in 2012 and provide five of the ship control and weapon systems to the winning contractor, who would construct up to 5 ships of the same design and install the systems. However, in November 2010, following receipt of new industry proposals for the fiscal year 2010 seaframes, the Navy proposed to change its acquisition strategy back to awarding new construction contracts to both industry teams.<sup>2</sup>

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<sup>1</sup> The decision to select a single ship design is referred to as the “downselect.”

<sup>2</sup> In response to the Navy's September 2009 LCS acquisition strategy change, General Dynamics and Austal USA revoked their teaming arrangement for future seaframes, in turn allowing the General Dynamics Bath Iron Works shipyard to compete for selection as the planned potential second source of the winning design. Austal USA and Lockheed Martin are the prime contractors competing for the current 10-ship program.

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In August 2010, we issued a report evaluating LCS planning and implementation efforts that identified technical, design, and construction challenges that could impact the Navy's ability to deliver promised LCS capabilities.<sup>3</sup> This statement highlights findings from that report and a subsequent report issued on December 8, 2010, which assessed risks that could affect the Navy's ability to execute the LCS program.<sup>4</sup> As detailed in our most recent report, we found that regardless of the strategy selected, the Navy continues to face design and construction risks in executing the LCS program, given its stage of maturity and its unique mission, design, and operational concept. These risks threaten the Navy's ability to achieve the cost savings it estimates under either of its acquisition strategies.

In preparing this testimony, we relied primarily on work supporting our most recent LCS report. That report contains a detailed overview of our scope and methodology. All of our work for this report was performed in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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## Summary

Successful business cases for shipbuilding programs require balance between the concept selected to satisfy warfighter needs and the resources—technologies, design knowledge, funding, time, and management capacity—needed to transform that concept into a product. Without a sound business case, program execution will be hampered, regardless of the contracting strategy. The LCS, given its stage of maturity and its unique mission, design, and operational concept, still faces design and construction risks. Most of these risks appear to be inherent to the program, regardless of which acquisition strategy is followed. Navy officials believe that experience to date on the program, coupled with fixed price contracts and a sufficient budget for ship changes, mitigates this risk. However, much work and demonstration remains for LCS, and

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<sup>3</sup> See GAO, *Defense Acquisitions: Navy's Ability to Overcome Challenges Facing the Littoral Combat Ship Will Determine Eventual Capabilities*, [GAO-10-523](#) (Washington, D.C.: Aug. 31, 2010).

<sup>4</sup> See GAO, *Navy's Proposed Dual Award Acquisition Strategy for the Littoral Combat Ship Program*, [GAO-11-249R](#) (Washington, D.C.: Dec. 8, 2010).

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other shipbuilding programs have had difficulty at this stage. On the other hand, a second ship design and source provided under the dual award strategy could provide the Navy an additional hedge against risk, should one design prove problematic. Mission equipment packages are common to both ships and would pose the same execution risks, apart from integration.

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## Key Features of the Downselect and the Dual-Award Strategies

The Navy estimates that both its existing and proposed acquisition strategies will generate significant cost savings to the government. According to the Navy, \$1.9 billion in savings resulted from the competition between the two offerors and is common to both strategies. However, the Navy estimates that approximately \$1.0 billion in additional cost savings would be realized under the proposed dual award strategy because of the avoidance of higher start-up costs and risks associated with the second source planned for fiscal year 2012, among other factors. According to the Navy, these additional savings would be offset, in part, by increased total ownership costs. The Navy plans to use some of the remaining savings, if realized, to fund construction of an additional LCS seaframe in fiscal year 2012. Table 1 compares the key tenets of each strategy.

**Table 1: Comparison of the Navy’s Current and Proposed LCS Acquisition Strategies**

Existing LCS acquisition strategy (January 2010)	Proposed LCS acquisition strategy (November 2010)
Contract with a single source on a fixed-price basis for up to 10 ships (2 ships awarded per year) from fiscal year 2010 through fiscal year 2014	Fixed-price contracts to two industry teams for up to 10 ships each (1 or 2 ships awarded per year) through fiscal year 2015 (total of up to 20 ships)
<p>Second solicitation for up to 5 additional ships to be constructed at a separate yard with awards planned between fiscal years 2012 and 2014.</p> <ul style="list-style-type: none"> <li>First source would provide the combat systems for the 5 additional ships constructed by the second shipyard</li> </ul>	<p>Program benefits, as identified by the Navy, that include:</p> <ul style="list-style-type: none"> <li>stabilizing the program and the industrial base with award of 20 ships,</li> <li>funding an additional ship in fiscal year 2012 to support operational requirements,</li> <li>sustaining competition through the program, and</li> <li>enhancing Foreign Military Sales opportunities</li> </ul>
<p>Navy estimates \$1.9 billion in cost savings attributable to:</p> <ul style="list-style-type: none"> <li>near-term competitive pricing pressures between the two current LCS shipbuilding teams,</li> <li>economic order quantity purchases of key materials,</li> <li>efficiencies associated with potentially moving to a single, common combat system, and</li> <li>significantly reduced total ownership costs for the Navy</li> </ul>	<p>Navy estimates program benefits would generate approximately \$1 billion in additional savings (which the Navy equates to a net present value of \$910 million) above those estimated under the existing strategy that are attributable to:</p> <ul style="list-style-type: none"> <li>avoiding higher start-up costs (such as nonrecurring engineering and design costs) associated with awarding contracts to a second source starting in fiscal year 2012 and by</li> <li>achieving greater labor efficiencies by constructing the ships at a higher rate</li> </ul>
Navy estimates that the cost benefits would be offset, in part, by the start-up costs associated with introducing a second source in fiscal year 2012.	According to the Navy, these savings would be offset, in part, by an additional \$842 million in total ownership costs, which the Navy equates to a net present value of \$295 million.

Source: GAO analysis of Navy materials.

Note: Given time constraints, GAO did not fully assess the Navy’s assumptions that underpin the benefits it estimates for each strategy.

The quantities planned under both of the Navy’s strategies are similar through fiscal year 2015. These similarities are outlined in table 2, which details the Navy’s procurement plans for seaframes under both the existing downselect strategy and the proposed dual award strategy.

**Table 2: LCS Seaframe Procurement Plans**

		Fiscal year 2010	Fiscal year 2011	Fiscal year 2012	Fiscal year 2013	Fiscal year 2014	Fiscal year 2015	Total
Existing downselect	Winner	2	2	2	2	2	4	19
	Second source			1	2	2		
	<b>Total</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>4</b>	<b>4</b>	
Proposed dual award	Contractor A	1	1	2	2	2	2	20
	Contractor B	1	1	2	2	2	2	
	<b>Total</b>	<b>2</b>	<b>2</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>	

Source: Navy.

Under the dual award strategy, the government will be authorized to contract for up to 20 ships. In contrast, the existing downselect strategy limits this authorization to up to 10 ships until fiscal year 2012, when the Navy planned to solicit a second source for additional ships.

## Design Changes Could Increase Near-Term Costs above Current Estimates

Under both the existing downselect strategy and the proposed dual award strategy, the Navy plans to award fixed-price incentive contracts for new seaframes. This type of contract provides for adjusting profit and establishing the final contract price by application of a formula based on the relationship of total final negotiated cost to total target cost. The final price is subject to a price ceiling, negotiated at the outset. In the case of LCS, the solicitation stated that the government would share 50 percent of costs above the target cost, up to the price ceiling. Navy officials also stated that they have budgeted management reserve funds to accommodate potential impacts to cost performance during program execution. In other programs, the Navy has returned to Congress to request funding for costs exceeding the target costs. In the near term, cost increases are likely but it is unknown whether increases will exceed what the Navy has budgeted for fiscal years 2010 and beyond. The likely source of these cost increases is design changes, which result in out-of-sequence work, potentially limiting the shipbuilders' ability to achieve the benefits they anticipate from construction process improvements and shipyard capital investments.

Our August 2010 report on LCS discussed issues with the performance of particular ship systems at the time of lead ship deliveries and as a result of

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subsequent operating experience.<sup>5</sup> In an effort to address technical issues on the first two ships, the Navy has implemented design changes for the third and fourth LCS seaframes (LCS 3 and LCS 4), several of which are not yet complete. These changes are significant and have affected the configuration of several major ship systems including propulsion, communications, electrical, and navigation. In addition, launch, handling, and recovery systems for both designs are still being refined, although the Navy reports recent progress related to each of these systems.<sup>6</sup> To the extent that these design changes necessitate modifications in the ship specifications on which the contractors based their proposals for future ships, contract modifications will need to be negotiated and priced. According to the Navy, it estimates funding requirements for these change orders to total 5 percent for all future follow-on ships produced, regardless of whether it proceeds with a downselect strategy or the proposed dual award strategy. In addition, Navy officials stated that the seaframe solicitation includes a provision that agreed to design changes are “not to exceed” \$12 million—a feature that Navy officials state will bound government cost risk due to design changes. Pending full identification and resolution of deficiencies affecting the lead ships, the Navy’s ability to stay within its budgeted limits remains to be seen.

As we reported earlier this year, the LCS shipbuilding teams have implemented process and capacity improvements based on lessons learned from constructing lead ships and have made capital investments in their yards in an effort to increase efficiency.<sup>7</sup> Fully realizing these improvements may be challenging given the design changes still occurring in the program. To the extent that addressing technical issues disrupts the optimal construction sequence for follow-on ships, additional labor hours could be required beyond current forecasts. Introducing such

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<sup>5</sup> [GAO-10-523](#).

<sup>6</sup> According to Navy officials, the most recent progress related to LCS launch, handling, and recovery systems consists of (1) successful operation and movement of an embarked 11-meter rigid-hull inflatable boat onboard LCS 1 in March 2010, (2) synthetic lift lines on LCS 2 successfully completing a 200 percent lift test, and (3) routine usage of a straddle carrier to move an 11-meter rigid-hull inflatable boat (with stowage cradle) and berthing modules around the LCS 2 mission bay. In addition, Navy officials state that LCS 1’s system is scheduled to begin testing with the mine countermeasures mission package in fiscal year 2011 and testing of LCS 2’s twin-boom extensible crane is progressing.

<sup>7</sup> See GAO, *Defense Acquisitions: Guidance Needed on Navy’s Use of Investment Incentives at Private Shipyards*, [GAO-10-686](#) (Washington, D.C.: Jul. 26, 2010) and [GAO-10-523](#).



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inefficiencies could offset initial benefits obtained from the process improvements and new facilities the shipbuilders have put into place, increasing the risk of out-of-sequence work and rework. Some level of design changes can be reasonably expected given the testing that remains. To date, however, Navy officials report that LCS 3 and LCS 4 changes are being managed efficiently—citing improved cost and schedule performance by both shipbuilders. The Navy also believes that the LCS seaframe may be less affected by mission equipment changes than other ships given the equipment’s modular design. Maintaining a high level of performance will depend on avoiding significant design changes to seaframes under construction.

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## Operations and Support Costs Difficult to Estimate

Navy officials expressed confidence that their cost estimate supporting the dual award provides details on the costs to operate and support both designs. However, since little actual LCS operating and support data are available to date, the Navy’s estimates for these costs are currently based on data from other ships and could change as actual cost data become more available. These estimates are also based on new operational concepts for personnel, training, and maintenance that have not been fully developed, tested, and implemented. For example, the Navy has not yet implemented a comprehensive training plan, and it is possible that the plan could cost more or less than the training costs currently accounted for by the Navy.

In addition, the Navy has not studied—within the context of the downselect strategy—the potential savings associated with early retirement of the two nonselected design ships. As such, decision makers do not have a complete picture of the various options available to them related to choosing between the downselect and dual award strategies. Under the existing downselect strategy, the Navy’s intention is to keep in service—at least initially—the other two ships of the design not selected for long-term production. The Navy acknowledged that operating and supporting two different designs carries increased costs as compared to the costs of employing only one design. As we previously reported, these costs include separate training facilities because each design has unique equipment and therefore different operating and maintenance requirements.<sup>8</sup> In February 2010, we recommended that the Navy conduct

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<sup>8</sup> See GAO, *Littoral Combat Ship: Actions Needed to Improve Operating Cost Estimates and Mitigate Risks in Implementing New Concepts*, [GAO-10-257](#) (Washington, D.C.: Feb. 2, 2010).

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a cost-benefit analysis of options for these two ships, including the possibility of retiring them from service—a recommendation with which the Department of Defense agreed. As we point out in the February report, it is important that estimates of long-term operating and support costs are available to assess alternatives before a decision is made, particularly since these costs constitute over 70 percent of a system’s life cycle costs. However, in discussions with Navy officials in November 2010, they told us that their latest assessment of the long-term costs of maintaining two ship designs does not consider the option of retiring the two nonselected ships.

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## Mission Package Uncertainties and Delays

The Navy’s request to double its current 10-ship authorization to 20 ships—at a time when the mine countermeasures, surface warfare, and antisubmarine warfare mission packages continue to face significant developmental challenges—highlights the Navy’s risk of investing in a fleet of ships that has not yet demonstrated its promised capability. Absent significant capability within its mission packages, seaframe functionality is largely constrained to self-defense as opposed to mission-related tasks.

Navy officials acknowledged that mission package systems have taken significantly longer to develop and field than anticipated. Underscoring this situation is the fact that development efforts for most of these systems predate the LCS program—in some cases by 10 years or more. However, Navy officials expressed confidence that their latest testing and production plans for mission package systems are executable.

Recent testing of mission package systems has yielded mixed results. The Navy reports that two systems within the mine countermeasures mission package recently completed developmental testing, but another system is undergoing reliability improvements following production of several units that did not meet performance requirements.<sup>9</sup> Further, test failures contributed to the cancellation of a key surface warfare mission package

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<sup>9</sup> According to Navy officials, the AN/AQS-20A sonar and Airborne Laser Mine Detection System recently completed developmental testing in August and October 2010, respectively. Alternatively, the Remote Minehunting System—produced since 2005—continues to struggle with reliability shortfalls. This has prompted the Navy to implement a series of design changes to the vehicle component and evaluate reducing the system’s performance requirements.

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system, and the future composition of the package remains undetermined.<sup>10</sup>

Developmental challenges facing individual systems have led to procurement delays for all three mission packages and have disrupted program test schedules. Most notably, the Navy reports the first operational testing event involving a seaframe and partial mission package is now scheduled for late second quarter of fiscal year 2012, and the Navy expects individual mission package systems to remain in development through 2017.<sup>11</sup>

To safeguard against excess quantities of ships and mission packages being purchased before their combined capabilities are demonstrated, we recommended in our August 2010 report that the Secretary of Defense update the LCS acquisition strategy to account for operational testing delays in the program and resequence planned purchases of ships and mission packages, as appropriate.<sup>12</sup> The Department of Defense agreed with this recommendation, stating that an updated schedule was under development to better align seaframe and mission module production milestones. However, it is unclear how the department's concurrence with our recommendation can be reconciled against the Navy's current request to increase the planned seaframe commitment, particularly since no operational testing involving mission packages—or any of their individual systems—has since taken place. Until mission package and operational testing progresses—and key mine countermeasures, surface warfare, and antisubmarine warfare systems are proven effective and suitable onboard seaframes—the Navy cannot be certain that the LCS will deliver the full capability desired. This risk would increase with a commitment to higher quantities. The Navy believes this increased commitment is appropriately balanced against competing risks in the program.

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<sup>10</sup> Development of the Non-Line-of-Sight Launch System—an anticipated key system within the surface warfare package—was canceled in 2010 following test failures and higher than expected cost estimates. The Navy continues to evaluate alternatives to replace this capability onboard LCS.

<sup>11</sup> According to Navy officials, the planned fiscal year 2012 operational test will employ the first LCS (LCS 1) seaframe and a (partial) surface warfare mission package. This date represents a recent update to the program's testing plan as the Navy's fiscal year 2011 budget estimates showed this event occurring in the third quarter of fiscal year 2013.

<sup>12</sup> [GAO-10-523](#).

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Mr. Chairman, that concludes my statement. I would be pleased to answer any questions.

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## Contact and Staff Acknowledgments

For future questions about this statement, please contact me at (202) 512-4841 or [francisp@gao.gov](mailto:francisp@gao.gov). Individuals making key contributions to this report were Belva Martin, Acting Director; Diana Moldafsky, Assistant Director; Christopher R. Durbin; Jeremy Hawk; Kristine Hassinger; Simon Hirschfeld; and Karen Zuckerstein.

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